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A revision of the freshwater crabs of the family Pseudothelphusidae (Decapoda: Brachyura) from Ecuador

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Abstract.—Revised diagnoses and illustrations of the species of pseudothelphusid crabs previously known to occur in Ecuador are provided and five new species. *Hypolobocera esmeraldensis*, *H. konstanzae*, *H. muisnensis*, *H. mindonensis* and *Lindacatalina sumacensis*, are described. The validity of pentanomial names proposed in the literature for some Ecuadorian species is revised in the light of series of specimens collected in their distributional areas. The genera *Hypolobocera*, *Moritschus* and *Lindacatalina* are redefined and several species are reassigned among these genera.

The systematics of Neotropical freshwater crabs of the family Pseudothelphusidae is relatively complex due to lack of dependable taxonomic differences in their carapace and appendages. The male first gonopods provide the most reliable characters of diagnostic value, whereas potential somatic characters, such as the dentition of the lateral border, form and position of the cervical grooves and postfrontal lobes, sculpturing of the front, and proportions of the third maxilliped, display very slight interspecific differences.

In almost all cases it is not possible to establish infraspecific categories that will meet the two criteria accepted for other animal groups, viz., that the differences are slight, but constant through large series of specimens (Mayr 1964), and that no overlap occurs in the geographical distribution of the supposed subspecies (Mayr et al. 1953).

In his revision of the Pseudothelphusidae, Pretzmann (1972) proposed the organization of the taxa into a tetranomial scheme (genus, subgenus, species and subspecies). In further contributions he arranged some crabs from Ecuador into a more elaborate pentanomial nomenclature (Pretzmann 1978, 1983a, 1983b). Thus, for example, what he called *Hypolobocera* (*Hypolobocera*) *aequatorialis aequatorialis* in 1972, became *Hypolobocera* (*Hypolobocera*) [*aequatorialis*] *aequatorialis aequatorialis* in his later contributions. The erection of these infraspecific categories was based usually on one or two specimens. In some cases two infraespecific categories of the same species were reported from the same localities (see for instance *Hypolobocera* (*Hypolobocera*) [*peruviana*] *henrici henrici* and *Hypolobocera* (*Hypolobocera*) [*peruviana*] *henrici nora*). This treatment of the Ecuadorian species has resulted in considerable confusion and serious difficulties for the identification of binomial taxa.

In the present contribution the validity of some of these infraspecific taxa is revised in the light of series of specimens collected in the same areas as Pretzmann's materials (Pretzmann & Radda 1978). All new or critical species reported here are fully illustrated. For other species only figures of the first male gonopods are given, together with references to adequate illustrations in the literature (see "Additional illustrations" under each species). Two species, *Hypolobocera conradi* (Nobili, 1897) and *Lindacatalina hauserae* Pretzmann, 1977b, are

not illustrated for lack of material. Terminology for gonopod morphology follows Smalley (1964).

Abbreviations used are cl. for carapace length and cb. for carapace breadth. The materials recorded are deposited in the Reference Collection of the Instituto Venezolano de Investigaciones Científicas, Caracas (IVIC), the British Museum, London (BM), the Museum of Natural History of Tulane University, New Orleans (TU), the National Museum of Natural History, Smithsonian Institution, Washington, D. C. (USNM), the Muséum nationale d'Histoire naturelle, Paris (MNHN), the Strasbourg Museum (SM) and the Naturmuseum und Forschunginstitut Senckenberg, Frankfurt am Main (SMF).

Systematics

Family Pseudothelphusidae Rathbun, 1893

Key to Genera from Ecuador

1. Lateral margin of first gonopods produced into a defined, although sometimes reduced, lateral lobe 2
–. Lateral margin widening progressively towards the apex which extends considerably laterally, giving the apex in caudal view a characteristic triangular-elongated appearance ..... *Moritschus*
2. Lateral lobe densely covered with spinules. Exognath of third maxilliped usually more than 0.45 length of ischium of endognath ..... *Lindacatalina*
–. Lateral lobe naked or with a few sparse spinules and short hairs. Exognath of third maxilliped usually less than 0.45 length of ischium of endognath ..... *Hypolobocera*

Hypolobocera Ortmann, 1897

Diagnosis.—Exognath of third maxilliped usually less than 0.45 length of ischium of endognath (Table 1). First male gonopods with strong longitudinal ridge on caudal surface, and well defined (although sometimes reduced) lateral lobe (Fig. 1A); apex truncated, either circular or oblong in distal view, with round papilla near spermatic channel (Fig. 1B).

Table 1.—Carapace breadth (cb) of largest males recorded and proportions of the exognath to ischium of endognath of third maxillipeds in Ecuadorian Pseudothelphusidae.

	cb (mm)	Exognath/ endognath
Hypolobocera aequatorialis	66.8	0.35
H. caputii	41.9	0.40
H. conradi	88.0	0.30
H. delsolari	65.1	0.30
H. esmeraldensis	33.8	0.40
H. exuca	61.8	0.30
H. guayaquilensis	44.1	0.30
H. konstanzae	56.8	0.30
H. mindonensis	27.1	0.30
H. muisnensis	51.6	0.35
H. orcesi	23.5	0.30
H. rathbuni	45.0	0.35
Lindacatalina brevipenis	27.5	0.65
L. hauserae	25.0	0.50
L. latipenis	55.7	0.50
L. orientalis	28.0	0.65
L. puyensis	32.3	0.45
L. sumacensis	35.6	0.45
Moritschus ecuadorensis	25.5	0.45
M. henrici	91.1	0.40

Type species.—*Potamia chilensis* H. Milne Edwards & Lucas, 1844.

Distribution.—Panama, Colombia, Venezuela, Ecuador and Peru.

Key to Species from Ecuador

1. Lateral lobe of first gonopods reduced or obsolescent (Figs. 1E, 4A) 2
–. Lateral lobe well developed 6
2. Lateral lobe with small scattered papillae (Fig. 7A) ..... *H. mindonensis*
–. Lateral lobe with smooth surface or with scattered short hairs 3
3. One or two prominent tubercles on apex of first gonopods 4
–. No prominent tubercles on apex of first gonopods 5
4. One prominent tubercle; apex produced laterally into extraordinarily long, obtuse lobe (Fig. 4B) ..... *H. exuca*
–. Two prominent tubercles on apex of gonopods (Fig. 9A–C) ..... *H. orcesi*

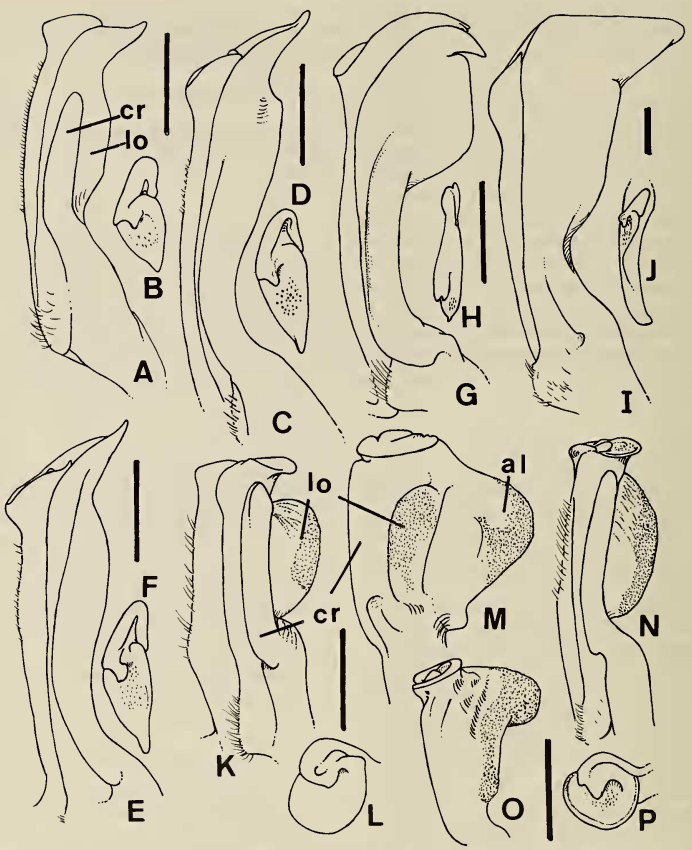

Fig. 1. First left gonopod of Ecuadorian Pseudothelphusidae: A, B, *Hypolobocera aequatorialis* (Ortmann, 1897), holotype from Ecuador (SM); C, D, *H. caputii* (Nobili, 1901), from Río Quevedo (IVIC 628); E, F, *H. rathbuni* Pretzmann, 1968, from Río Peripa, between Aurora en Puerto Limón (IVIC 631); G, H, *Moritschus ecuadorensis* (Rathbun, 1897), from west of Gualea (BM 918.1.31.11); I, J, *M. henrici* (Nobili, 1897), from Ecuador (IVIC 615); K-M, *Lindacatalina brevipenis* (Rodríguez & Díaz), 1981, from Ecuador (IVIC 606); N–P, *L. latipenis* (Pretzmann, 1968), from Ecuador (IVIC 621). A, C, E, G, I, K, N, caudal; M, O, lateral; B, D, F, H, J, L, P, apex, distal; lo, lateral lobe; cr, caudal ridge; al, supplementary lobe. Scales = 2 mm.

5. With large tubercle on external surface of palm ..... *H. conradi*
–. Without a large tubercle on external surface of palm ..... *H. rathbuni*

6. Lateral lobe of first gonopods long, oblong, with proximal angle rounded and distal angle sloping gently to apex ... 7
–. Lateral lobe triangular or subtriangular... 8

7. A large tubercle on external surface of palm ..... *H. delsolari*
–. Without a large tubercle on external surface of palm ..... *H. aequatorialis*
8. Apex of first gonopods in caudal view forms very elongated spine, projected laterally and distally (Figs. 1C, 3A) .. 9
–. Apex in caudal view with lateral border obtuse or with short spine (Figs. 5A,6A,8A) 10
9. Border of lateral lobe straight or slightly convex distally ..... *H. caputii*
–. Border of lateral lobe rounded distally ..... *H. esmeraldensis*
10. Apex in distal view with lateral margin acute or ending in a short point directed laterally 11
–. Apex in distal view with lateral margin rounded ..... *H. muisnensis*
11. Border of lateral lobe expanded and rounded distally ..... *H. guayaquilensis*
–. Border of lateral lobe narrow and transverse distally ..... *H. konstanzae*

Hypolobocera aequatorialis
(Ortmann 1897)
Figs. 1A, B

Pseudothelphusa dentata.—Ortmann, 1893: 493 (pro parte ex. b, c).

Potamocarcinus aequatorialis Ortmann, 1897:317, 319, pl. 17, fig. 5.

Pseudothelphusa aequatorialis.—Rathbun, 1898:532, 537.—Young, 1900:213.—Nobili, 1901:38.—Rathbun, 1905:285.—Colosi, 1920:18.—Coifmann, 1939:106.

Strengeria (*Strengeria*) *aequatorerorialis* [sic].—Pretzmann, 1965:7.

Hypolobocera (*Hypolobocera*) *aequatorialis aequatorialis.*—Bott, 1967:368, fig. 3a–c.—Pretzmann, 1971:17; 1972:43, figs. 186–189, 265–267.

Hypolobocera aequatorialis.—Rodriguez, 1982:61 (pro parte and fig. 33e, f).

Hypolobocera (*Hypolobocera*) [*aequatorialis*] *aequatorialis aequatorialis.*—Pretzmann, 1983b:351, figs. 4, 18, 26, 39, 54, 56, 71.

Hypolobocera (*Hypolobocera*) *aequatorialis nigra* Pretzmann, 1968:6; 1972:44, figs. 167–169, 262–264; 1971:17.

Hypolobocera (*Hypolobocera*) [*aequatorialis*] *aequatorialis nigra.*—Pretzmann, 1983b:352, figs. 3, 17, 25, 35, 52, 55, 72.

Material.—Ecuador: Leg. Reiss, 1 male holotype of *Potamocarcinus aequatorialis* Ortmann, 1897 (SM).—Arroyo de Arrayán, N of Baños, Parroquia de Chirgua, Tungurahua Province, 1750 m alt., 7 Nov 1980, leg. H. Díaz, 3 males cl. 31.5, 31.0 and 21.8 mm, cb. 49.8, 48.8 and 33.7 mm, 2 mature females cl. 35.0 and 34.1 mm, cb. 57.0 and 53.5 mm, 1 immature female cl. 27.8 mm, cb. 43.5 mm (IVIC 590).—Baños, Tungurahua Province, Dec 1984, leg. Ferro, 1 male, 1 immature female (IVIC 972).—Quebrada Punsán, Pueblo de Alba, E of Baños, Tungurahua Province, 1600 m alt., 7 Nov 1980, leg. H. Díaz, 1 male cl. 27.8 mm, cb. 43.4 mm, 1 immature female cl. 31.4 mm, cb. 49.5 mm (IVIC 591).—Río Villa, Ponce, 44 km N Machala, Azuay Province, 50 m alt., 11 Nov 1980, leg. H. Díaz, 70 males, the largest cl. 40.8 mm, cb. 66.8 mm, 57 females, the largest cl. 32.5 mm, cb. 51.6 mm (IVIC 624).—Cantón San Miguel, 5 km N of Balsapamba, roadside stream feeding into Río Cristal, Bolívar Province, 20 May 1996, leg. R. von Sternberg, 7 males, the largest cl. 19.4 mm, cb. 30.5 mm, 1 juvenile (IVIC 940).—Town of Pullatanga, Chimborazo Province, 15 Feb 1996, leg. R. von Sternberg, 6 males, 2 females (IVIC 969).—Village of Ocaña, Cañar Province, 8 Jun 1996, leg. F. von Sternberg, 1 male, 10 juveniles (IVIC 970).

Additional illustrations.—Rodríguez (1982, figs. 19k; 22d,i; 23f; 33a–f.)

Diagnosis.—Carapace with upper frontal margin angled, with faintly indicated papillae and deep notch at middle. Larger chela with oblong, but not well developed, dark protuberance near articulation of fingers and smaller dark tubercle above it. Lateral lobe of first male gonopods prominent, square in outline; apex in caudal view funnel-shaped; in distal view elongated laterally and ending in spine directed distally and transversely to main axis of appendage.

Remarks.—Ortmann (1893) identified as *Pseudothelphusa dentata* three lots of crabs from South America. Later he (Ortmann 1897) separated lots b and c, from Río Ucayalli, Perú, and the Eastern Cordillera of Ecuador, respectively, under his new species *Potamocarcinus aequatorialis*, but he used as types only the specimens from the second locality. The first male gonopods of these specimens (Rodríguez 1982, fig. 33e, f) closely correspond with those of the specimens recorded above from the vicinity of Baños and from Ponce, near Machala, but the specimens recorded by Rodríguez (1982, fig. 33a–d) from Río Jubones belong in *Hypolobocera delsolari*. Bott (1967) recorded the species from Paramba, on the headwaters of Río Mira, 75 km from Tulcán, Imbambura Province. In the material reported above from Ponce, near Machala, the first gonopods exactly correspond with those of the type material and with those of our specimens from Baños; the only difference is that in the largest male (cl. 40.8 mm) from the first loclity the spine of the apical lobe is directed laterally and perpendicularly to main axis of the appendage. In the specimens from Ponce the papillae on antero-lateral margins of carapace are more clearly defined. According to these records, *H. aequatorialis* occupies widely separated areas on the eastern and western slopes of the Eastern Cordillera of Ecuador.

Pretzmann used the specific name *Hypolobocera aequatorialis* in several contributions (Pretzmann 1968, 1977b, 1983b). In his most recent one (Pretzmann 1983b) he grouped under this species the following forms: *Hypolobocera* (*Hypolobocera*) [*aequatorialis*] *aequatorialis aequatorialis*, *Hypolobocera* (*Hypolobocera*) [*aequatorialis*] *aequatorialis nigra*, *Hypolobocera* (*Hypolobocera*) [*aequatorialis*] *delsolari delsolari*, *Hypolobocera* (*Hypolobocera*) [*aequatorialis*] *delsolari isabella*. It is not possible to discern from this pentanomial nomenclature whether the author assigned a subspecific rank to these forms. In the present contribution *Hypolobocera* (*Hypolobocera*) [*aequatorialis*] *delsolari delsolari* is considered as a separate species and *Hypolobocera* (*Hypolobocera*) [*aequatorialis*] *delsolari isabella* a junior synonym of this.

Pretzmann's (1968) original material of *Hypolobocera* (*Hypolobocera*) [*aequatorialis*] *aequatorialis nigra* comprised 1 male holotype, 1 male paratype and 3 females, collected by Cayan in 1883 at an undetermined locality in Ecuador. The first gonopods of the holotype was illustrated in Pretzmann 1972. Subsequently, he (Pretzmann 1977b) recorded the distribution of his taxon as "Westrand der Anden nordwestlich Machala". However, this distribution must refer to two lots of crabs recorded later (Pretzmann 1983b) from 20 and 35 km NE of Machala in the Río Jubones basin. There are no clear cut characters that separate our specimens collected around Machala from the typical *H. aequatorialis*, even in the coloration of the specimens which was given as one of the diagnostic characters. In specimens from a single locality preserved in alcohol, some specimens are dark brown, almost black, on anterior portion, including cervical grooves, while other have cervical grooves and cardiac regions olive. On the other hand, *H. delsolari*, *H. muisnensis* and H. *orcesi* also display this last pattern of coloration, with the cervical grooves and gastric regions of a lighter shade than the dorsal surface of carapace.

Hypolobocera caputii (Nobili 1901)
Fig. 1C, D

Pseudothelphusa caputii Nobili, 1901: 38.—Rathbun, 1905:299.—Colosi, 1920: 20.—Coifmann, 1939:107.—Rodríguez, 1982:190.

Strengeria (*Strengeria*) *caputi* [sic].—Pretzmann, 1965:7 (pro parte).

Strengeria (*Strengeria*) *caputii*.—Pretzmann, 1972:40; 1983b:353.

Hypolobocera (*Hypolobocera*) *caputii caputii*.—Pretzmann, 1971:17; 1972:40 (pro parte) figs. 254, 255, not figs. 270–

272, 302, 303 [=*Hypolocera chilensis* (H. Milne Edwards & Lucas, 1844)]; 1983b:353, figs. 2, 22, 29, 38, 48, 59, 65.

Hypolobocera (*Hypolobocera*) [*chilensis*] *caputii*.—Pretzmann, 1977b:436.

Hypolobocera quevedensis Rodríguez & Díaz, 1981:308, figs. 2, 6, 7.

Material.—Ecuador: Río Quevedo, 36 km N of Quevedo, Pichincha Province, 24 Jun 1976, leg. H. Díaz, 1 male holotype of *H. quevedensis*, cl. 26.8 mm, cb. 41.9 mm (IVIC 628).—Puerto Rico, Quevedo, Los Ríos Province, 3 males cl. 21.5, 17.9 and 14.0 mm, cb. 33.4, 27.8 and 21.2 mm (TU 94-100-1, USNM 273521).

Additional illustrations.—Rodríguez & Díaz (1981, figs. 2, 6, 7).

Diagnosis.—Carapace with upper frontal margin well defined although not projected, with some tubercles faintly indicated and deep notch at middle. Larger chela with small swelling on outer surface, at articulation of dactylus. First male gonopods with lateral lobe well developed, long, subtriangular, with distal margin angled, advanced; apex with conspicuous lanceolate lobe directed distally.

Remarks.—Nobili (1901) in his original description of *Pseudothelphusa caputii* did not give an illustration of the male gonopods, and they were only vaguely described as "lunghe e robuste, troncate e svasate obliquamente all'apice." Since the holotype and only specimen recorded could not be located at the Museo Zoologico di Torino, where it was presumably to be deposited, Rodríguez (1982) considered this species incertae sedis. These circumstances also led Rodríguez & Díaz (1981) to erroneously describe their material from Quevedo under a new species, *H. quevedensis*. Pretzmann (1965, 1971 and 1972) recorded *Hypolobocera caputii* on several occasions, but never stated that he had examined the holotype, although subsequently he (Pretzmann 1983b) illustrated the gonopod, carapace, orbital area and third maxilliped of the holotype, thus validating his report of this species.

Nobili's species has been recorded in the literature from Río Peripa (Nobili 1901, Pretzmann 1983b), 42 km from Quevedo (Rodríguez & Díaz 1981, holotype of *Hypolobocera quevedensis*); Quevedo and Mindo (Pretzmann 1983b). The latter author gives as the general distribution of *Hypolobocera caputii* the basins of the Daule and Vincens rivers.

Hypolobocera conradi (Nobili 1897)

Pseudothelphusa conradi Nobili, 1897:3; 1901:38.—Rathbun, 1898:533, 537 (pro parte); 1905:298, fig. 90a, d (pro parte, not material from Perú and fig. 90b, c).—Young, 1900:217.—Colosi, 1920:19.—Coifmann, 1939:107.—Rodríguez, 1982: 63.

Strengeria (*Strengeria*) *conradi*.—Pretzmann, 1965:7.

Potamocarcinus (*Hypolobocera*) *conradi*.—Bott, 1967:367, fig. 2a, b, c.

Hypolobocera (*Hypolobocera*) *conradi conradi*.—Pretzmann, 1971:17; 1972:41, fig. 273, 274; 1977b:430, fig. 1; 1983b: 356, figs. 74, 79–83.

Pseudothelphusa dubia Colosi, 1920:19.—Coifmann, 1939:107.

Hypolobocera (*Hypolobocera*) *dubia*.—Pretzmann, 1972:48 (pro parte, not the material from Colombia and figs. 224–226, 230–232, 236, 237).

Material.—Ecuador: Sabanilla, 18 km NNE from Loja, headwaters of Río Zamora, Zamora Province, Sep 1985, leg. L. Coloma, 2 males cl. 20.7 and 19.1 mm, cb. 31.5 and 29.2 mm (IVIC 946).

Additional illustrations.—Bott (1967, fig. 2a, b, c).

Diagnosis.—Carapace with upper frontal margin angled, with flat papillae and deep notch at middle. Large flat tubercle on the insertion of the dactylus of the larger chela, fingers conspicuously high. First male gonopods slender, with lateral lobe long, re-

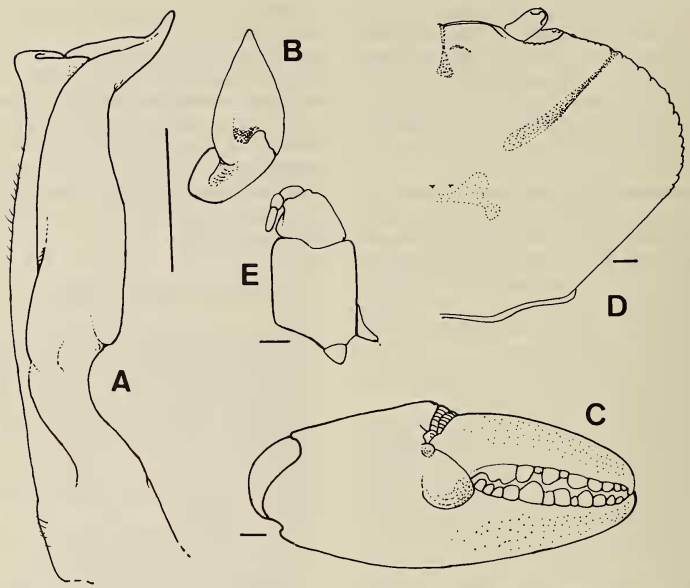

Fig. 2. *Hypolobocera delsolari* Pretzmann, 1978, male from Quebrada Celata, Azuay Province, Ecuador (IVIC 960): A, first left gonopod, caudal; B, apex, distal; C, chela of largest cheliped, external view; D, dorsal view of right side of carapace; E, third maxilliped. Scales = 3 mm.

tracted; apex with conspicuous lateral expansion, in distal view triangular.

Remarks.—The status of Nobili's type material was discussed by Rodríguez (1982), who considered the male recorded by Bott (1970) from Río Santiago as the neotype of the species. Our specimens were collected in a locality within this basin. Since we have examined only the two small males mentioned above, it is not possible to revise the description of the species or to present adequate illustrations. The largest male (20.7 mm cb.) already has a large flat tubercle on the insertion of the dactylus of the larger (left) chela, and the first male gonopods, although not fully developed, present the retracted lateral lobe and the apical expansion characteristic of this species.

Hypolobocera delsolari Pretzmann, 1978
Fig. 2

Hypolobocera (*Hypolobocera*) [*aequatorialis*] *delsolari delsolari* Pretzmann 1977b:436 (nomen nudum); 1978:163, fig. 1; 1983a:304, figs. 11, 12; 1983b: 350, fig. 58.—Rodríguez, 1982:210.

Hypolobocera (*Hypolobocera*) [*aequatorialis*] *delsolari isabella* Pretzmann 1977b: 436 (nomen nudum); 1978:163, fig. 2; 1983a:304, figs. 13, 14;1983b:350.—Rodríguez, 1982:210.

Hypolobocera aequatorialis.—Rodríguez, 1980:61 (pro parte) figs. 19k, 23f, 33a–d.

Material.—Ecuador: Río Jubones, leg. Dr. Bray, 2 males cl. 41.0 and 24.6 mm, cb. 65.1 and 40.9 mm (BM).—Quebrada Ce-

lata, 1 km from Girón, Azuay Province, 9 Nov 1980, leg. H. Díaz, 1 male cl. 36.6 mm, cb. 58.5 mm, 3 ripe females cl. 48.5, 48.2 and 44.5 mm, cb. 79.5, 75.0 and 70.9 mm, 1 immature female cl. 28.7 mm, cb. 44.8 mm, 2 juveniles (IVIC 960).—Río Chorro, affluent of Río San Vicente in the Río Jubones basin, near Girón, Azuay Province, 11 Nov 1980, leg. H. Díaz, 1 male cl. 37.6 mm, cb. 60.6 mm, 1 immature female cl. 29.0 mm, cb. 45.3 mm (IVIC 959).—Quera, military checkpoint, border of Azuay and El Oro provinces, stream feeding into Río Jubones, 22 May 1996, leg. R. von Sternberg, chela and portions of carapace of a specimen cl. 36.5 mm, cb. 57.5 mm, 4 juveniles (IVIC 942).—Village of Tres Banderas, Azuay Province, roadside ditch, Río Jubones adjacent, 22 May 1996, leg. R. von Sternberg, 2 young males, the largest cl. 17.6 mm, cb. 26.1 mm, 2 juvenile females (IVIC 941).

Diagnosis.—Carapace with upper frontal margin angled, devoid of papillae, with deep notch at middle. Larger chela with large rounded tubercle below articulation of dactylus. First male gonopods with lateral lobe long, oblong, wider proximally; apex with conspicuous lanceolate lobe directed distally.

Remarks.—The apex of the first gonopods in this species resembles that of *Hypolobocera caputii* (Nobili, 1901) in the lateral apical process, but differs in the shape of the lateral lobe.

Hypolobocera esmeraldensis, new species
Fig. 3

Material.—Ecuador: Esmeraldas Province, leg. Juan Carlos, 1 male holotype cl. 20.6 mm, cb. 33.8 mm, 1 immature female cl. 20.9 mm, cb. 33.6 mm (TU 94-100-2).—Chone River, Manabí Province, 1 mature male, broken carapace (TU 94-100-3).

Diagnosis.—Carapace with upper frontal margin devoid of median notch and tubercles. First gonopods with caudal ridge obsolescent distally; lateral lobe narrow, more prominent and excavated distally; apex in distal view with strong curved point projected laterally and distally, in caudal view very elongated laterally.

Description of holotype.—Upper surface of carapace smooth and polished, with regions only slightly indicated. Lateral border of carapace with shallow postorbital notch, without teeth or papillae up to level of cervical grooves; rest of border with approximately 12 distinct triangular teeth which diminishes in size progressively and end at middle of border. Cervical grooves straight and deep, not reaching margins of carapace. Postfrontal lobes absent, its place marked only by 1 or 2 punctae; median groove absent. Upper margin of front almost straight or slightly convex in dorsal view, without median notch and devoid of tubercles. Lower margin sinuous in frontal view; space between both margins narrow.

Palm of larger cheliped (left) moderately inflated, fingers slightly gaping. Exognath of third maxilliped 0.4 length of ischium of endognath.

First male gonopods strongly arcuate in lateral view; caudal ridge curved, becoming indistinct distally; lateral lobe narrow, excavated and more prominent distally; apex in distal view with strong curved point projected laterally and distally, in caudal view very elongated.

Etymology.—The species is named after the Esmeraldas Province where the species was collected.

Hypolobocera exuca Pretzmann, 1977b
Fig. 4

Hypolobocera (*Hypolobocera*) [*conradi*] *exuca* Pretzmann, 1977b:437, fig. 8; 1983b:357, figs. 91–94.
Hypolobocera riveti Rodríguez, 1980:891; 1982:49, figs. 19b, 20e, j, 23b, 25a–e.

Material.—Ecuador: 10 km N of La Troncal, on Río Culebras/Taura, Cañar Province, in a concrete storm drainage ditch, 6 Jun 1996, leg. R. von Sternberg, 1 male cl. 37.6 mm, cb. 59.3 mm, 1 female

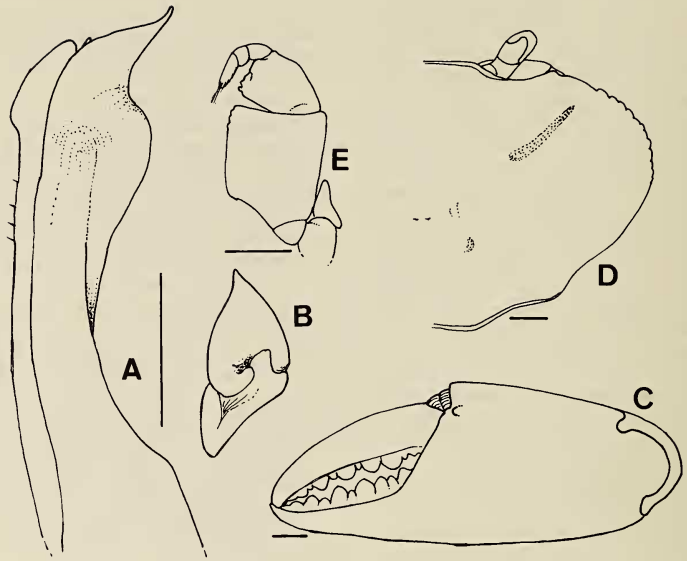

Fig. 3. *Hypolobocera esmeraldensis*, new species, holotype male from Esmeralda Province, Ecuador (TU 94-100-2): A, first left gonopod, caudal; B, apex, distal; C, chela of largest cheliped, external view; D, dorsal view of right side of carapace; E, third maxilliped. Scales = 3 mm.

cl. 21.1 mm, cb. 33.2 mm, 9 juveniles (IVIC 949).—Between La Troncal and Manuel J. Calles, 65 km SE of Guayaquil, Cañar Province, 100 m alt., 10 Nov 1980, leg. H. Diaz, 1 immature male cl. 18.2 mm, cb. 27.2 mm (IVIC 627).—Town of Las Pampas, on Río Toachi, Cotopaxi Province, Oct 1988, leg. G. Onore, 1 male cl.32.4 mm, cb. 50.5 mm (IVIC 950).—Ecuador, without other data, leg. P. Rivet, 2 males cl. 40.8 and 23.6 mm, cb. 61.8 and 37.6 mm, holotype and paratype respectively of *Hypolobocera riveti* Rodríguez, 1980 (MNHN B-5087).

Diagnosis.—Carapace with upper frontal margin angled, with small papillae and deep notch at middle. First male gonopods with lateral lobe absent, replaced by wide depression; apex in lateral view funnel-shaped, with strong elongated projection ending in truncated tip; in distal view strongly expanded cephalically, with conspicuous ridge on caudal side of expansion; prominent subtriangular papilla on caudal side of gonopore; distinct subapical ridge on mesial side.

Remarks.—Pretzmann (1977b) gave as his type locality "Cordillere". The present records fix the area of distribution of the species between the provinces of Cañar and Cotopaxi.

Hypolobocera guayaquilensis Bott, 1967
Fig. 5

Potamocarcinus (*Hypolobocera*) *aequatorialis guayaquilensis* Bott, 1967:368, figs. 4a, b, c.

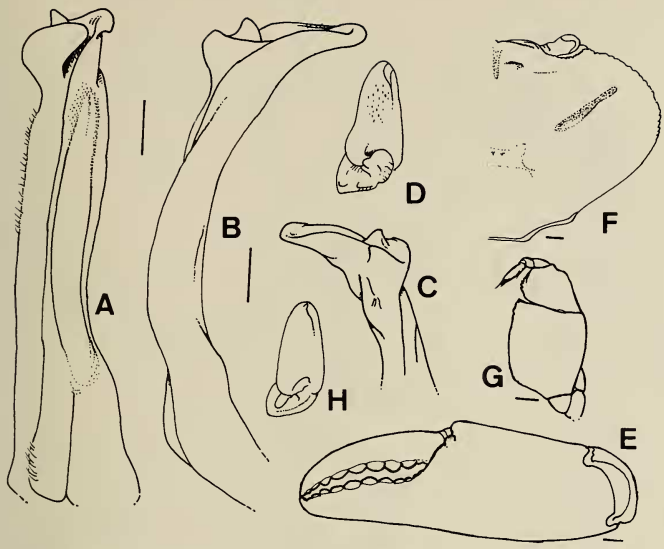

Fig. 4. *Hypolobocera exuca* Pretzmann, 1977b, A–G, male from 10 km N of La Troncal, Cañar Province, Ecuador (IVIC 949): A, first left gonopod, caudal; B, lateral; C, apex, caudo-distal; D, apex, distal; E, chela of largest cheliped, external view; F, dorsal view of right side of carapace; G, third maxilliped. H, specimen from Las Pampas, Cotopaxi Province, Ecuador (IVIC 950), first left gonopod, apex, distal. Scales = 3 mm.

Hypolobocera (*Hypolobocera*) *caputii guayaquilensis.*—Pretzmann, 1971:17 (by inference).

Hypolobocera (*Hypolobocera*) *guayaquilensis.*—Pretzmann, 1972:42, figs. 173–175, textfig 10. *Hypolobocera* (*Hypolobocera*) [*aequatorialis*] *guayaquilensis.*—Pretzmann, 1983b:353, figs. 5, 16, 28, 37, 53, 57, 69.

Hypolobocera guayaquilensis.—Rodríguez, 1982:64.

Material.—Ecuador: Chone, Estero Donde, Manabí Province, 9 Aug 1967, 3 males cl. 26.2, 18.3 and 14.7 mm, cb. 44.1, 29.3 and 23.5 mm, 1 female with young under the abdomen cl. 34.5 mm, cb. 56.2 mm (TU 6374).

Diagnosis.—Carapace with upper frontal margin angulated and devoid of conspicuous tubercles, with notch at middle. First male gonopods strongly arcuate in lateral view; caudal ridge prominent, moderately curved proximally, straight distally; lateral lobe triangular, increasing in width distally, with distal margin rounded; apex in distal view elongated along meso-lateral axis, ending in short lateral point directed laterally.

Remarks.—The type locality is Babahoyo, on the Daule-Vincens basin. The specimens reported above come from a locality 140 km NNW of Babahoyo, on the coastal plain, but the water divide between both basins, on the Conguillo Mountains, is less than 300 m above sea level in some places.

Hypolobocera konstanzae, new species
Fig. 6

Material.—Ecuador: Estero San Agustín, 4 km S from the bridge, Río Banchal, Manabí

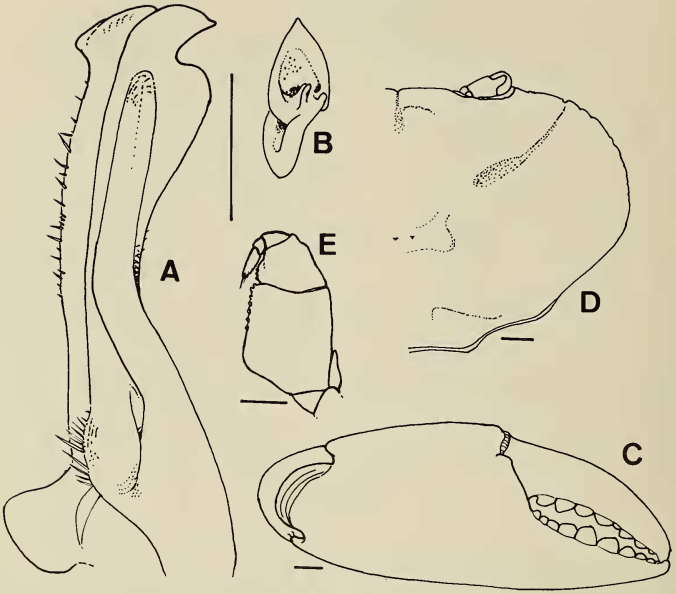

Fig. 5. *Hypolobocera guayaquilensis* Bott, 1967, male from Chone, Manabi Province, Ecuador (TU 6374): A, first left gonopod, caudal; B, apex, distal; C, chela of largest cheliped, external view; D, dorsal view of right side of carapace; E, third maxilliped. Scales = 3 mm.

Province, 6 Jun 1977, leg. H. Díaz, 1 male holotype cl. 37.5 mm, cb. 56.8 mm (IVIC 593).—Village of Cascol, stream adjacent to Río Banchal, lower Río Daule basin, Manabí Province, approx. 1° 40′ S, 80° 30′ W, 4 Jun 1996, leg. R. von Sternberg, 2 young males paratypes (the largest soft shell) cl. 21.8 and 18.9 mm, cb. 33.5 and 29.1 mm respectively, 3 juvenile males, 3 immature females, the largest cl. 22.3 mm, cb. 34.3 mm (IVIC 951).

Diagnosis.—Carapace with upper frontal margin angled, devoid of papillae, with deep notch at middle. First male gonopods with lateral lobe reduced, subtriangular, more expanded distally; apex in caudal view funnel-shaped, moderately elongated laterally, not ending in defined spine; in distal view roughly obtuse-angled, lateral expansion rounded.

Description of holotype.—Carapace narrow (cb/cl = 1.51), surface smooth. Anterolateral margins without shallow notch behind external orbital angles, margin behind it and up to level of cervical grooves smooth, almost straight; approximately 8 small papilliform teeth behind level of cervical grooves, progressively less prominent posteriorly. Cervical grooves almost straight, deep, not reaching margins of carapace. Postfrontal lobes well defined, transverse, with anterior margin rounded; median groove well defined, very narrow anteriorly, making deep incision on upper frontal margin of carapace. Upper frontal margin bilobed in dorsal view; angled, devoid of papillae; lower margin strongly sinuous; space between upper and lower margins narrow.

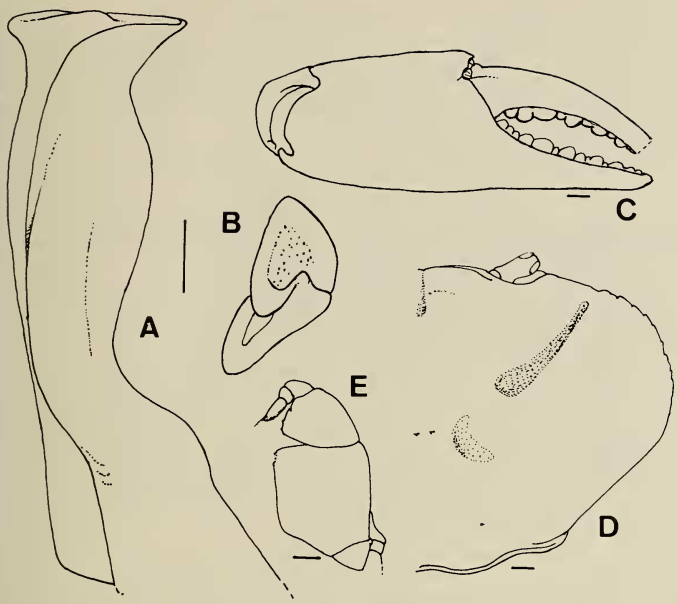

Fig. 6. *Hypolobocera konstanzae*, new species, holotype male from Río Banchal, Manabi Province, Ecuador (IVIC 593): A, first left gonopod, caudal; B, apex, distal; C, chela of largest cheliped, external view; D, dorsal view of right side of carapace; E, third maxilliped. Scales = 3 mm.

Exognath of third maxilliped 0.30 length of ischium of endognath. Chelipeds elongated. Fingers gapping, covered by punctae and few inconspicuous papillae.

First male gonopods with caudal ridge proximally strong and curved to follow strangled shape of basal portion; distally progressively indistinct; lateral lobe reduced, subtriangular, more expanded distally; apex in caudal view funnel-shaped, moderately elongated laterally, not ending in defined spine; in distal view roughly obtuse-angled, lateral expansion rounded; papilla on caudal side of gonopore replaced by semicircular ridge.

Remarks.—The paratypes display the following differences in regard to holotype: The carapace surface has small pores and papillae not visible to naked eye; the antero-lateral margins possess 10–12 small well defined teeth behind level of cervical grooves, which are progressively less prominent posteriorly; the cervical grooves are straight, and reach the margins of carapace; the upper frontal margin is covered with rudimentary papillae; the lower margin is moderately sinuous.

Etymology.—The species is dedicated to Miss Konstanza von Sternberg, for her assistance in the collection of crabs in Ecuador.

Hypolobocera mindonensis, new species
Fig. 7

Material.—Ecuador: Confluence of Río Salaya and Río Mindo, Pichincha Prov-

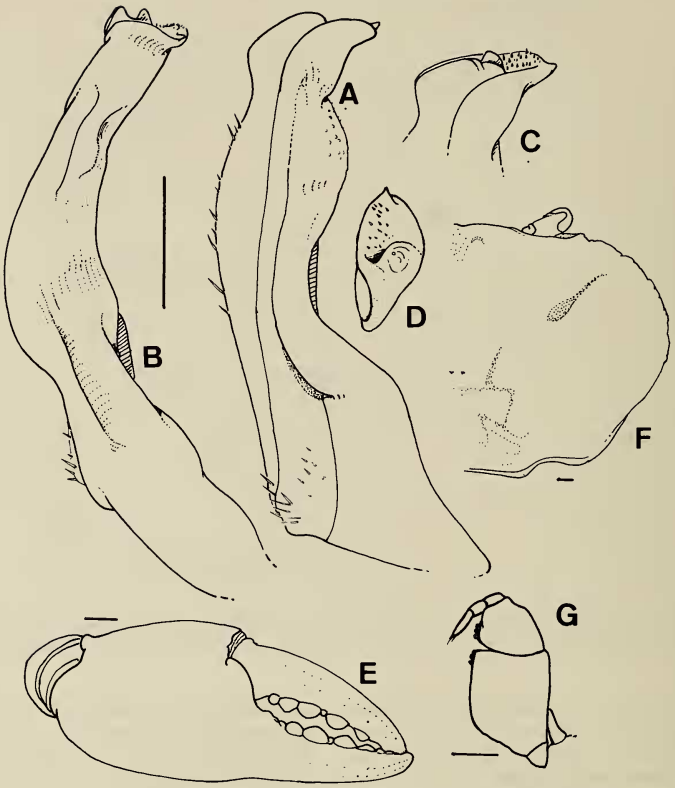

Fig. 7. *Hypolobocera mindonensis*, new species, holotype male from the confluence of Río Salaya and Río Mindo, Ecuador (TU 94-100-4): A, first left gonopod, caudal; B, lateral; C, apex, caudo-distal; D, apex, distal; E, chela of largest cheliped, external view; F, dorsal view of right side of carapace; G, third maxilliped. Scales = 3 mm.

ince, between 1000 and 1200 m altitude, Sep 1968, leg. M. Olalla, 1 male holotype cl. 11.3 mm, cb. 27.1 mm, 14 male paratypes cl. 16.9, 14.7, 14.7, 14.4, 14.4, 14.2, 14.2, 13.7, 13.6, 12.9, 12.0, 11.5, 11.0, and 10.9 mm, cb. 25.2, 23.9, 23.2, 22.2, 23.7, 23.3, 23.1, 21.4, 21.0, 19.4, 18.1, 17.5, 16.5, and 16.4 mm, 2 ovigerous females cl. 15.5 and 15.1 mm, cb. 24.9 and 23.0 mm, with 13 and 18 eggs respectively, 10 mature female paratypes cl. 13.6–22.3 mm, cb. 20.5–33.4 mm, 6 immature females, the largest cl. 17.0 mm, cb. 26.2 mm (TU 94-100-4).

Diagnosis.—Carapace with upper frontal margin rounded, with small papillae and deep notch at middle. First male gonopods with lateral lobe narrow and regu-

larly rounded in outline, covered with minute flattened papillae; apex in caudal view funnel-shaped; elongated in distal view, strong triangular tooth on lateral corner and conical elevated tubercle on caudal side of gonopore.

Description of holotype.—Cervical grooves deep and wide proximally, shallow and straight distally, not reaching margins of carapace. Antero-lateral margins with well defined incision behind outer orbital angle and several ill-defined papillae behind it; tooth at level of cervical grooves and 8–10 very small teeth over rest of margin. Postfrontal lobes almost obsolete, its place indicated by 2 slight swellings; median groove shallow, wide. Upper margin of front rounded, slightly bilobed in dorsal view, with small papillae which are obsolescent towards sides, and deep notch at middle; lower margin moderately sinuous in frontal view; space between upper and lower margins narrow.

Exognath of third maxilliped 0.30 length of ischium of endognath. Larger cheliped with palm inflated, smooth; fingers slightly gapping, with brown-black punctae arranged in parallel lines.

First male gonopods strongly constricted at middle; caudal ridge curved, strongly contoured proximally, becoming indistinct distally; lateral lobe narrow and regularly rounded in outline, with minute flattened papillae; apex funnel shaped in caudal view; elongated along latero-mesial axis, with strong triangular tooth on lateral corner in distal view; conical elevated papilla on caudal side of gonopore.

Etymology.—The species is named after Río Mindo, where it was collected.

Hypolobocera muisnensis, new species.
Fig. 8

Material.—Ecuador: Estero Lojca More, Muisne Salima, Esmeraldas Province, 21 Oct 1988, leg. J. C. Vieira, 1 male holotype cl. 31.1 mm, cb. 51.6 mm (IVIC 952).—Estero El Cañero, La Concordia, Esmeraldas Province, 1 Oct 1988, leg. J. C. Vieira, 1 male cl. 20.7 mm, cb. 31.9 mm (IVIC 953).—Same data, 8 Oct 1988, 1 male cl. 24.2 mm, cb. 39.5 mm (IVIC 954).—Estero Moncauve, Recinto Moncauve, Esmeraldas Province, 5 Jan 1988, leg. J. C. Vieira, 1 male cl. 24.2 mm, cb. 39.5 mm (IVIC 955).

Diagnosis.—Carapace with upper frontal margin well defined, angled, without conspicuous papillae, with deep notch at middle. First male gonopods with lateral lobe triangular, increasing in width distally, with distal margin excavated; apex elongate along meso-lateral axis in distal view, cephalic margin rounded, horseshoe shaped.

Description of holotype.—Lateral border of carapace with shallow notch behind outer orbital angle, followed by short undulated segment; 12–16 very small triangular teeth behind level of cervical grooves, regularly-spaced, subequal in size except for last 3–4 which are squamiform. Cervical grooves deep and wide, slightly arched, reaching margin of carapace. Postfrontal lobes well marked, with distal margin transverse; median groove well defined, forming deep incision at upper border of front; this border well defined, angled, without conspicuous papillae; lower margin thick, strongly sinuous, advanced in relation to upper margin; space between upper and lower margins narrow.

Exognath of third maxilliped 0.35 length of ischium of endognath. Chelipeds heavy, fingers gaping, with rows of minute dark points over outer surface.

First male gonopods strongly arcuate in lateral view; caudal ridge prominent, curving proximally, straight distally; lateral lobe triangular, increasing in width distally, with distal margin excavated; apex in distal view elongated along meso-lateral axis, cephalic margin rounded, horseshoe shaped.

Etymology.—The specific epiteth is de-

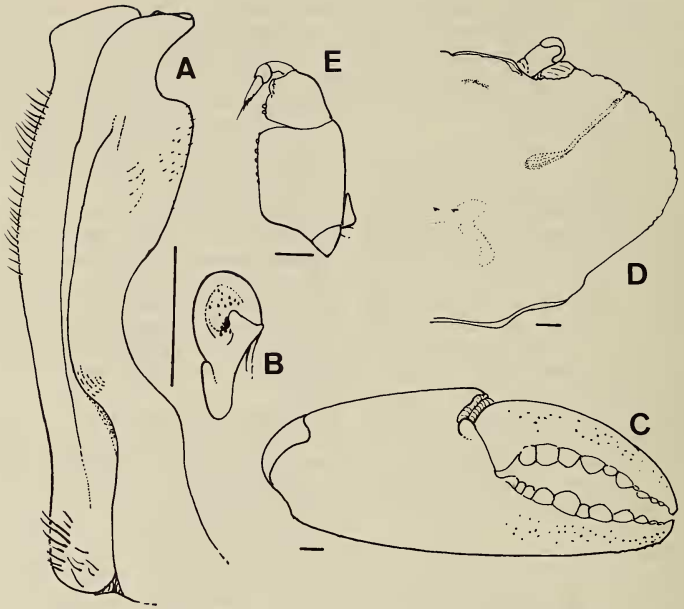

Fig. 8. *Hypolobocera muisnensis*, new species, holotype male from Muisne Salima, Ecuador (IVIC 952): A, first left gonopod; B, apex, distal; C, chela of largest cheliped, external view; D, dorsal view of right side of carapace; E, third maxilliped. Scales = 3 mm.

rived from part of the locality's name where the species was collected.

Hypolobocera orcesi Pretzmann, 1978
Fig. 9

Hypolobocera (*Lindacatalina*) [*plana*] *orcesi* Pretzmann, 1978:166, fig. 6; 1983b: 361.

Hypolobocera (*Lindacatalina*) *orcesi*.— Pretzmann, 1983a:303, pl. 7, 8.

Material.—Ecuador: Valley of Río Mindo, 5 km from Mindo, Pichincha Province, 28 May 1996, leg. R. von Sternberg, 1 male cl. 14.2 mm, cb. 23.5 mm, 1 male soft shell cl. 11.1 mm, 1 juvenile male, 1 mature female cl. 14.8 mm, cb. 24.3 mm (IVIC 956).

Diagnosis.—Carapace with upper frontal margin rounded, devoid of defined papillae. First male gonopods with caudal ridge strongly geniculated proximally, indistinct distally; lateral lobe undifferentiated in caudal view, forming thin ridge in lateral view; apex funnel-shaped in caudal view, projected cephalically in lateral view, subtriangular in distal view, with lateral margin rounded; 2 prominent papillae near gonopore and on cephalic expansion.

Remarks.—The distal angle of the lateral lobe of the gonopod is more squarish in Pretzmann's (1978, fig. 6). Otherwise our material closely corresponds with the original description and with the supplementary characters given by Pretzmann (1983a, b). The

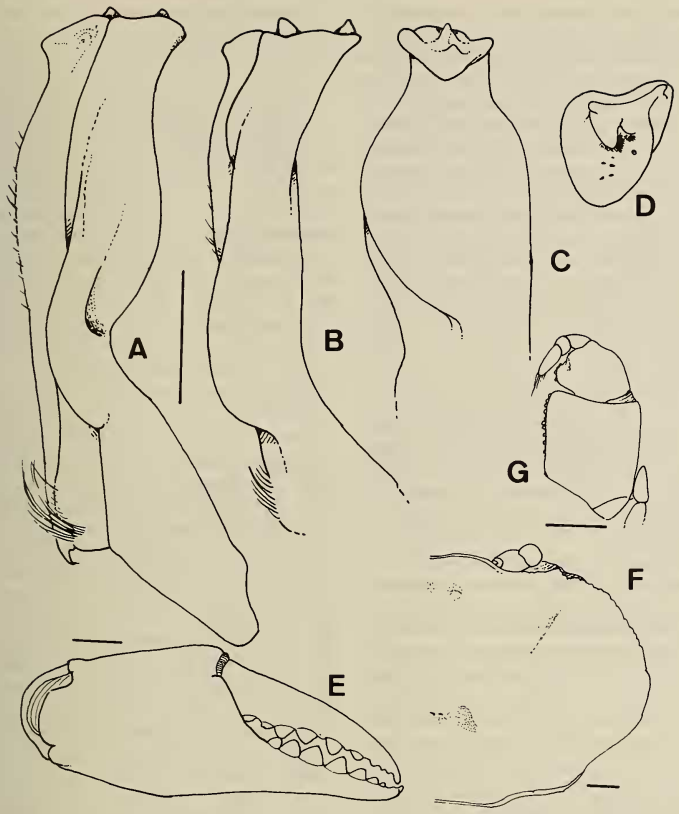

Fig. 9. *Hypolobocera orcesi* Pretzmann, 1978, male from valley of Río Mindo, Ecuador (IVIC 956): A, first left gonopod, caudal; B, lateral; C, cephalic; D, apex, distal; E, chela of largest cheliped, external view; F, dorsal view of right side of carapace, G, third maxilliped. Scales = 3 mm.

two prominent papillae, one near the gonopore and another on the cephalic expansion of the apex, are characteristic of this species.

Hypolobocera rathbuni Pretzmann, 1968
Fig. 1E–F

Hypolobocera (*Hypolobocera*) *rathbuni* Pretzmann, 1968:5.

Hypolobocera (*Hypolobocera*) *guayaquilensis rathbuni*.—Pretzmann, 1972:42, figs. 287–289.

Hypolobocera (*Hypolobocera*) *caputii rathbuni*.—Pretzmann, 1983b:354, figs. 1, 23, 30, 40, 51, 60, 64.

Hypolobocera rathbuni.—Rodríguez, 1982: 63, fig. 19p; 22b, g; 23e; 34a–c.

Material.—Ecuador: Santo Domingo, Pichincha Province, 490 m alt., 1 male neotype (Rodríguez 1982) cl. 23.7 mm, cb. 37.5 mm (BM 1918. 1.31.12).—Río Peripa, between Aurora and Puerto Limón, SW of Santo Domingo de los Colorados, Pichincha Province, 29 Nov 1980, leg. H. Díaz, 18 males, the largest cl. 27.7 mm, cb. 45.0 mm, 1 mature female cl. 22.2 mm, cb. 35.9 mm, 12 immature females, the largest cl. 19.6 mm, cb. 31.1 mm (IVIC 631).—Río Peripa, Puerto Limón, SW of Santo Domingo de los Colorados, Pichincha Province, 200 m alt., 29 Nov 1980, leg. H. Díaz, 1 male cl. 18.2 mm, cb. 28.6 mm, 1 spent female cl. 29.3 mm, cb. 46.4 mm, 1 immature female cl. 17.0 mm, cb. 26.7 mm, 2 juveniles (IVIC 629).—Río Peripa, San Miguel, 5 km from Aurora, SW of Santo Domingo de los Colorados, Pichincha Province, 29 Nov 1980, leg. H. Díaz, 1 immature male cl. 14.3 mm, cb. 22.1 mm, 1 immature female, 3 juveniles (IVIC 630).

Additional illustrations.—Rodríguez (1982, figs. 19p; 22b, g; 23e; 34a–c).

Diagnosis.—Carapace with upper frontal margin well defined by row of distinct papillae on each side and deep notch at middle. First male gonopods with caudal ridge prominent and curved proximally, obsolescent on distal half; lateral lobe long, narrow, slightly expanded distally, with outer border sinuous; apex in caudal view transverse, ending laterally in long spine; in distal view narrow, very elongated laterally, ending laterally in long acuminate spine; flat digitiform papilla on caudal side of gonopore.

Remarks.—There are slight differences between the neotype from Santo Domingo de los Colorados (Rodríguez 1982) and the specimens from Río Peripa. The relationship between the length of the exognath and the ischium of endognath in the third maxilliped of the neotype is 0.28, whereas in the others specimens range between 0.37 and 0.39. The flat papilla on the apex of gonopods has a minute denticle in the neotype which was not observed in the rest of the material listed above.

Lindacatalina Pretzmann, 1977b

Diagnosis.—Exognath of third maxilliped usually more than 0.45 length of ischium of endognath (Table 1). First male gonopods with strong longitudinal ridge on caudal surface; well developed lateral and supplementary cephalic lobes (this last rarely absent), both covered by minute spinules; apex truncated, circular in distal view, with two flat papillae near spermatic channel (Fig. 1K, L, M).

Type species.—*Hypolobocera* (*Lindacatalina*) *hauserae* Pretzmann, 1977b.

Distribution.—Southern Colombia and Ecuador.

Remarks.—We use Pretzmann's genus to group all Hypolobocerini with the lateral lobe of gonopods densely covered by spinules and frequently possessing a supplementary lobe, equally spinulous, on the cephalic side. We exclude from this genus two species that were included by Pretzmann (1977b), *Hypolobocera orcesi* which has a few sparse spinules on the lateral lobe, but not a continuous covering of this process, and *H. nobili* whose holotype is a female, and consequently their gonopods are not known. We place in this genus *Hypolobocera brevipenis* Rodríguez & Díaz, 1981, and a new species, *L. sumacensis*. Thus defined, the genus consist of an homogeneous group of species restricted to a small area on the Amazonian drainage of Southern Colombia and Ecuador.

Key to Species of *Lindacatalina*

1. Lateral lobe of first gonopods with supplementary cephalic lobe 2
–. Lateral lobe without supplementary lobe 5
2. Lateral and supplementary lobes fused distally 3
–. Lateral and supplementary lobes distinct 4
3. Supplementary lobe in cephalic view al-

most pyramidal or strongly excavated on the mesial side ..... *L. puyensis*
–. Supplementary lobe in cephalic view globular ..... *L. latipenis*
4. Lateral lobe wide, rounded, distinct; supplementary lobe triangular, not expanded distally ..... *L. brevipenis*
–. Lateral lobe narrow, partially fused to caudal ridge; supplementary lobe rounded, expanded distally ..... *L. sumacensis*
5. Lateral lobe square; wide apical portion almost reaching apex ..... *L. hauserae*
–. Lateral lobe rounded, not reaching apex ..... *L. orientalis*

Lindacatalina brevipenis (Rodríguez & Díaz 1981)
Figs. 1K–M; 12F, G

Hypolobocera brevipenis Rodríguez & Díaz, 1981:309, figs. 3, 8, 9.

Material.—Ecuador: without other data, leg. M. Olalla, 1 male holotype cl. 15.9 mm, cb. 27.7 (SMF 9140), 1 male paratype cl. 12.0 mm, cb. 20.3 mm (IVIC 606).

Additional illustrations.—Rodríguez & Díaz (1981, figs. 3, 8, 9).

Diagnosis.—Carapace with upper frontal margin rounded, devoid of tubercles. First male gonopods very short and stout; caudal ridge strong, geniculated and wrinkled at middle; lateral lobe auriculariform, wrinkled; supplementary cephalic lobe forming winged triangular expansion, distinct from lateral lobe, both lobes covered by minute spinules; apex oval and expanded laterally in distal view.

Remarks.—This species can be easily distinguished from other within the genus because the lateral and supplementary lobes are distinct and resemble each other in shape (Fig. 12f).

Lindacatalina hauserae Pretzmann, 1977b

Hypolobocera (Lindacatalina) hauserae Pretzmann, 1977b:437, fig. 10; 1983a: 301, pls. 1,2.
Hypolobocera (Lindacatalina) [nobili] hauserae.—Pretzmann, 1983b:358, fig. 10.

Diagnosis.—Carapace without upper frontal margin. First male gonopods slender, widening progressively proximally; apex oval-elongated in distal view, wider laterally than mesially; lateral lobe wide, placed in line with main axis of appendage; caudal ridge slightly rounded.

Remarks.—We have not seen material of this species, which is the type species of the genus *Lindacatalina*. The diagnosis given above was derived from Pretzmann's (1977b, 1983a, b) diagnoses and keys. The only specimens known, six males, three females, and six juveniles came from 2 km East of Mendez, Morona-Santiago Province.

Lindacatalina latipenis (Pretzmann 1968)
Figs. 1N–P; 12A–C

Hypolobocera (Hypolobocera) latipenis Pretzmann, 1968:8.
Hypolobocera (Hypolobocera) conradi latipenis.—Pretzmann, 1971:17; 1972:41, figs. 281–283.
Hypolobocera (Lindacatalina) latipenis latipenis.—Pretzmann, 1977b:432, figs. 5, 6, 11.
Hypolobocera (Lindacatalina) [latipenis] latipenis latipenis.—Pretzmann, 1983b: 357, figs. 12, 21, 34, 45, 49, 63, 68, 77, 78, 90.
Hypolobocera latipenis.—Rodríguez, 1982: 54, figs. 19n; 20a, f; 23a; 8a–e.

Material.—Ecuador: Faldas del Monte Sumaco, Loreto, Napo Province, 450 m alt., Jun 1968, leg. M. Olalla, 2 males, 1 female (TU 94-100-5).—Ecuador, leg. M. Olalla, 1 male cl. 33.8, cb. 55.7 mm (IVIC 621).

Additional illustrations.—Rodríguez (1982:54, figs. 19n; 20a, f; 23a; 8a–e).

Diagnosis.—Carapace with upper frontal margin well marked, with scattered tubercles. First male gonopods with caudal ridge distinct and strongly geniculated; lateral lobe large, wide, rounded; supplementary cephalic lobe forms large digitiform process transversely directed and fused distally to lateral lobe; both lobes covered by wrinkles

and spinules, apex in distal view circular, with wide flat papilla near gonopore.

Remarks.—Pretzmann (1972, 1983b) gives as the original citation of this species *Strengeria* (*Strengeria*) *latipenis* Pretzmann, 1965. However, the specific name did not appear for the first time in Pretzmann (1965), but latter, in Pretzmann (1968) as *Hypolobocera* (*Hypolobocera*) *latipenis*.

Lindacatalina orientalis (Pretzmann 1968)
Fig. 10

Hypolobocera (*Hypolobocera*) *plana orientalis* Pretzmann, 1968:2; 1971:17; 1972: 60, figs. 162–164, 214–221.

Hypolobocera (*Lindacatalina*) [*plana*] *plana orientalis.*—Pretzmann, 1983b: 360, figs. 8, 15, 33, 36, 46, 73.

Hypolobocera orientalis.—Rodríguez, 1982:52, figs. 19d, 20c, h, 26a–c.

Hypolobocera (*Hypolobocera*) *plana plana* Pretzmann, 1972:49, figs. 275–277, 304–307. Not *Pseudothelphusa plana* Smith, 1870:146, 147.—Pocock, 1889:10.—Nobili, 1897:3, 5—Rathbun, 1898:535, 537—Young, 1900:211—Rathbun, 1905: 278—Coifmann, 1939:109—Rodríguez, 1982:192. Not *Potamocarcinus planus.*—Ortmann, 1897:318 (see Remarks).

Hypolobocera (*Lindacatalina*) [*plana*] *plana plana.*—Pretzmann, 1983b:359, figs. 9, 14, 31, 41, 70.

Material.—Ecuador: Oriental Cordillera, Ecuador, 1874, leg. Reiss, 1 male holotype cl. 14.3 mm, cb. 22.3 mm, 7 males paratypes cl. 12.8, 12.6, 12.1, 11.9, 11.5, 10.1 and 9.9 mm, cb. 20.7, 19.6, 19.2, 18.9, 17.3, 15.4 and 15.0 mm, 2 immature females cl. 9.9 and 9.7 mm, cb. 14.7 and 14.3 mm (SM).—Roadside ditch between Calacali and Mindo exit, aprox. 20 km S of Mindo, Pichincha Province, 27 May 1996, leg. R. von Sternberg, 3 males cl. 15.0, 11.1 and 8.1 mm, cb. 26.5, 17.7 and 12.0 mm, 3 mature females cl. 16.3, 15.1 and 13.4 mm, cb. 27.8, 24.6 and 21.6 mm (IVIC 958).—Mindo, Pichincha Province, Jan 1994, leg. J. Garcés, 1 male cl. 16.2 mm, cb. 28.0 mm (IVIC 957).

Diagnosis.—Carapace with upper frontal margin rounded, devoid of defined papillae. First male gonopods with caudal ridge strongly geniculated at middle, progressively tapering to end near apex; lateral lobe very broad, extending from middle of appendage to near apex, rounded, covered by minute spinules on lateral surface; apex truncated in caudal view, oblong, expanded laterally into rounded projection in distal view.

Remarks.—The type material of *Pseudothelphusa plana* Smith, 1870, consisted of 2 females (cl 16.6 and 13.6 mm, cb. 27.7 and 22.4 mm) from Paita, Perú, in the Museum of Yale College, collected by Prof. James Orton. Smith (1870) description of carapace and appendages, although detailed, are generic for many species of Pseudothelphusidae and he did not include illustrations of the gonopods. The species was latter cited in the literature by Pocock (1889), Nobili (1897), Rathbun (1898, 1905), Young (1900), Coifmann (1939), and Ortmann (1897), but any of these authors examined materials of the species.

The types that, according to Smith (1870), were "rather badly preserved specimens," deteriorated further, and latter, Pretzmann (1972) stated that they were no longer available. Consequently he renamed the species as *Hypolobocera* (*Hypolobocera*) *plana plana*, proposed as neotype a male from Ecuador in the USNM (labelled as follows: Mindo, Pichincha Province, Ecuador, 1919 Irwing Expedition, leg. C. N. Eigenmann, cl. 7.9 mm, cb. 13.9 mm, USNM 68558), and also included under this species 10 males and 11 females from Cotocallao (1919 Irwing Expedition, USNM 68564). Latter he (Pretzmann 1983b) omitted these additional specimens and gave a new plurinominal name to the taxon, *Hypolobocera* (*Lindacatalina*) [*plana*] *plana plana*.

Rodríguez (1982) objected to Pretzmann (1972) neotype, and considered *Pseudo-*

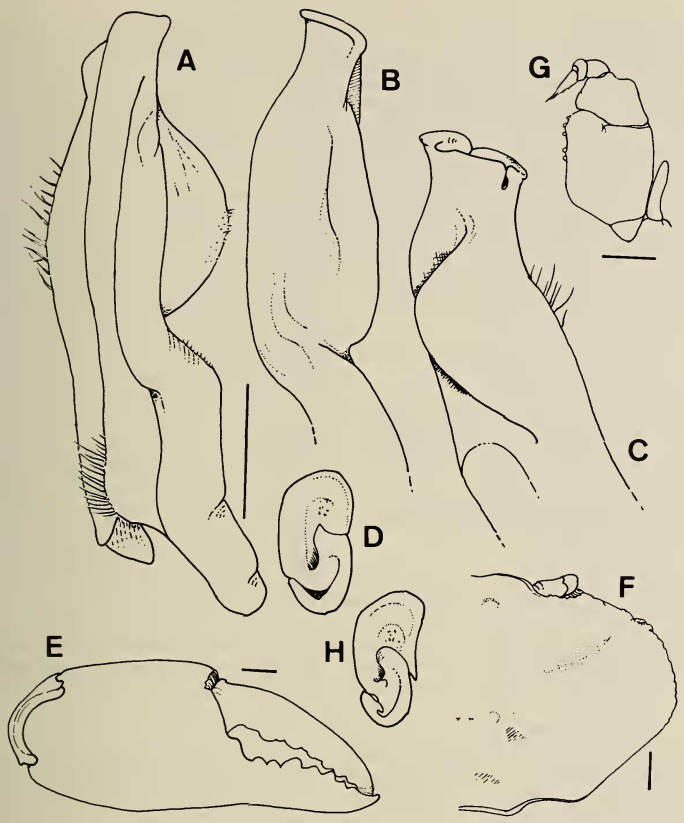

Fig. 10. *Lindacatalina orientalis* (Pretzmann, 1968): A–G, male from 20 km S of Mindo, Ecuador (IVIC 958): A, first left gonopod, caudal; B, lateral; C, cephalic; D, apex, distal; E, chela of largest cheliped, external view; F, dorsal view of right side of carapace; G, third maxilliped. H, male from Mindo (IVIC 957), apex of first gonopod, distal. Scales = 3 mm.

thelphusa plana as incertae sedis on the grounds that the original type locality (Paita) was isolated by a desert (Tumbez), and the neotype locality (Mindo) was 600 km to the north, on an entirely different river basin. Furthermore, there is no diagnostic character in Smith's original description to tie his species to the material examined by Pretzmann in the USNM.

The gonopods of our specimens from Mindo recorded above, and those of Pretzmann's (1972) neotype (USNM 68558) are identical to the illustrations of the gonopods of *Hypolobocera* (*Hypolobocera*) *plana or-*

ientalis Pretzmann, 1968 (see Pretzmann 1972, 1983b).

Another related taxon erected by Pretzmann (1977), *Hypolobocera* (*Lindacatalina*) [*plana*] *plana olallai*, cannot be differentiated from *Hypolobocera* (*Hypolobocera*) [*plana*] *plana plana* (=*Lindacatalina orientalis*) from the diagnosis or the sketchy illustration of the gonopod given by Pretzmann (1978, 1983b). We have found no specimens that could be attributed to *Hypolobocera* (*Lindacatalina*) [*plana*] *plana olallai* in our collections from the type locality (Aurora, Río Peripa) of this taxon.

Lindacatalina puyensis Pretzmann, 1978
Fig. 12 D, E

Hypolobocera (*Lindacatalina*) *latipenis puyensis* Pretzmann, 1977b:438 (nomen nudum); 1978:165, fig. 7; 1983a:302, pl. 5, 6.

Hypolobocera (*Lindacatalina*) [*latipenis*] *latipenis puyensis*.—Pretzmann, 1983b: 358, fig. 11.

Material.—Ecuador: Teniente Ortiz, 10 km N of Puyo, Río Rebadeneira, affluent of Río Arajuno, Pastaza Province, 980 m alt., 5 Nov 1980, leg. H. Díaz, 1 male cl. 19.8 mm, cb. 32.3 mm (IVIC 626).—Archidona, Cuevas de San Bernardo, Napo Province, 12 Jun 1986, leg. P. Villamar, 3 males cl. 16.8, 10.8 and 9.9 mm, cb. 29.0, 17.4 and 16.5 mm, 1 juvenile female, carapace broken, cb. aprox. 9 mm (IVIC 947).—Village of Talac, Napo Province, 1500 m, 28 Dec 1993, leg. S. Baez, 1 male cl. 18.0 mm, cb. 30.4 mm (IVIC 962).

Diagnosis.—Carapace with upper frontal margin well marked. First male gonopods with caudal ridge distinct and strongly geniculated; lateral lobe large, wide, rounded; supplementary cephalic lobe forms large conical process transversely directed and fused distally to lateral lobe; both lobes covered by wrinkles and spinules; apex in distal view circular, with wide flat papilla near gonopore.

Remarks.—The materials of this species and of *L. latipenis* come from localities within a small area between Puyo and Tena, and north of Tena. The specimens reported above are from localities 22 km and 35 km from the type locality of *L. puyensis*. The type locality of *L. latipenis* is 40 km ENE from Archidona. All these localities are located in a few small river basins draining to the upper reaches of the Napo River.

The first gonopods of the two species closely resemble each other, but in *L. puyensis* the supplementary lobe in cephalic view is oblong, almost pyramidal, and strongly excavated on the mesial side (Fig. 12D, E), whereas in *L. latipenis* it is clearly globular (Fig. 12A, B, C). The carapace breadth of all male specimens attributed to *L. puyensis* (3 type specimens and present records) is less than 35 mm, while *L. latipenis* attains a carapace breadth of at least 58 mm. It is possible that the male specimens attributed to *L. puyensis* are younger specimens of *L. latipenis*, or populations of dwarf individuals, a phenomenon that has been described in other Brachyura (Conde et al. 1989). This situation could be solved only by the discovery of mature females of small size. Pretzmann (1983a, b) recorded small females, but did not state whether they were mature. We are keeping both species distinct until more information is forthcoming.

Lindacatalina sumacensis, new species
Figs. 11, 12H, I

Material.—Ecuador: Faldas del Monte Sumaco, Loreto, Napo Province, 450 m alt., Jun 1968, leg. M. Olalla, 1 male holotype cl. 21.9 mm, cb. 35.6 mm, 10 males paratypes, 27 females, 7 of the largest mature females as follows: cl. 22.8, 20.9, 20.6, 20.5, 19.1, 19.1, and 18.4 mm, cb. 35.3, 32.9, 33.8, 34.9, 30.5, 29.3, and 29.1 mm (TU 94-100-6).—Same data, 11 males, 1 female with young under the abdomen cl. 19.5 mm, cb. 35.8 mm (IVIC 948).

Diagnosis.—Carapace with upper frontal

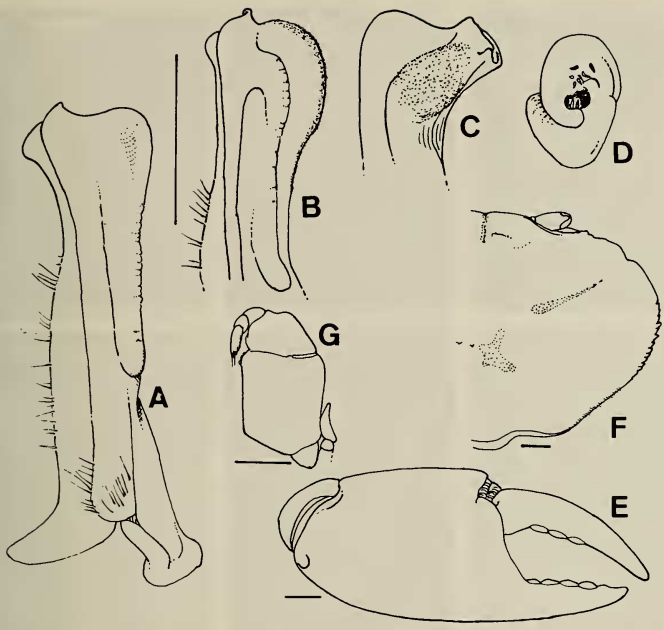

Fig. 11. *Lindacatalina sumacensis*, new species, holotype male from Monte Sumaco, Napo Province, Ecuador (TU 94-100-6): A, first left gonopod, caudal; B, lateral; C, apex, cephalic; D, apex, distal; E, chela of largest cheliped, external view; F, dorsal view of right side of carapace; G, third maxilliped. Scales = 3 mm.

margin angled, without conspicuous papillae, with inconspicuous notch at middle. First gonopods with caudal ridge straight, fused to lateral lobe, covered by minute transverse wrinkles; lateral lobe rounded, expanded distally; supplementary cephalic lobe rounded, thick, covered by minute spinules; apex oval in distal view.

Description of holotype.—Antero-lateral margins with wide notch after external orbital angles and another at level of cervical grooves; between these two notches and for short space behind second one, border devoid of teeth or papillae; towards the middle of border begins series of approximately 15 small but well defined triangular teeth. Cervical grooves wide and shallow, becoming indistinct toward margins of carapace. Postfrontal lobes small, but well defined, placed transversely in relation to middle axis of carapace; median groove wide and shallow. Upper margin of front rounded in dorsal view, with inconspicuous notch at middle, angled in frontal view, without conspicuous papillae; the lower margin strongly sinuous; space between both margins very narrow. Upper surface of carapace smooth and polished, covered by closely placed papillae not visible to naked eye.

Chelipeds strongly unequal; palm of larger one (right) inflated; fingers strongly gaping; movable finger strongly arched. Ex-

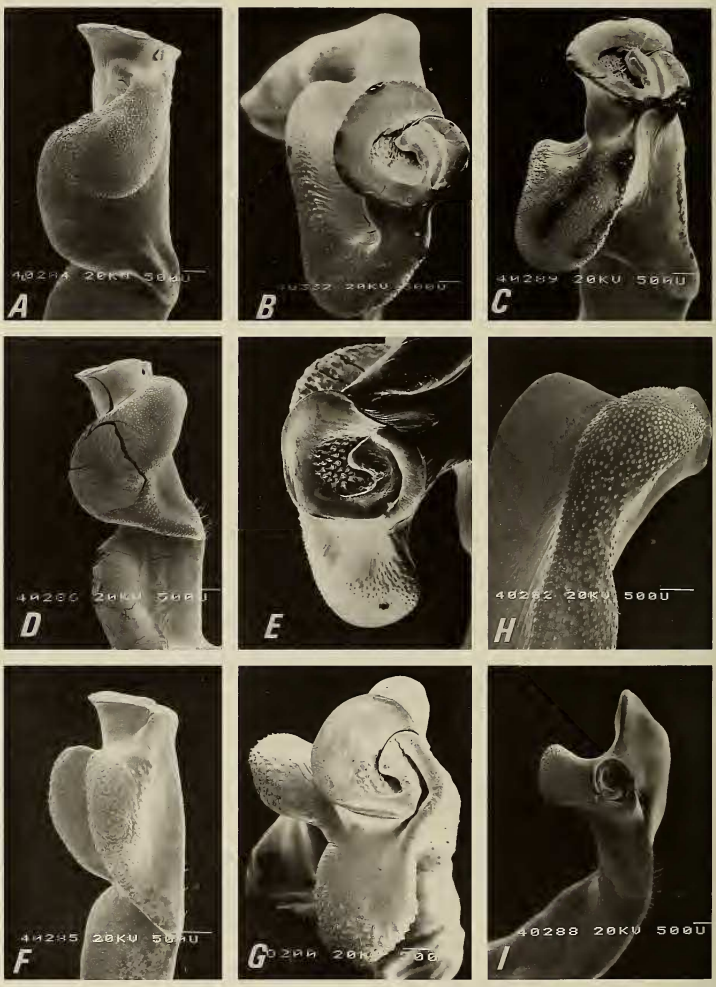

Fig. 12. First male gonopods of *Lindacatalina*. A, B, C, *L. latipenis* (Pretzmann, 1968), from Ecuador (IVIC 621); D,E, *L. puyensis* Pretzmann, 1978, from Teniente Ortiz (IVIC 626); F,G, *L. brevipenis* (Rodríguez & Diaz, 1981), from Ecuador (IVIC 606); H, I, *L. sumacensis* new species, holotype male from Monte Sumaco (TU 94-100-6). (A,D,F,H, cephalic; C, disto-cephalic; B,E,G,I, distal).

ognath of third maxilliped 0.46 length of ischium of endognath.

First male gonopods slender, strongly arched dorso-ventrally; caudal ridge straight, fused with lateral lobe, covered by minute transverse wrinkles; lateral lobe rounded, expanded distally; supplementary cephalic lobe rounded, thick, covered by minute spines; outline of apex oval in distal view.

Etymology.—This species is named after Monte Sumaco, where it was collected.

Moritschus Pretzmann, 1965

Diagnosis.—Exognath of third maxilliped usually more than 0.30 length of ischium of endognath (Table 1). First male gonopods with strong longitudinal ridge on caudal surface; lateral expansion continuos with apex of appendage; apex truncated, very elongated in distal view, with two flat papillae on side or in front of spermatic channel (Fig. 1I, J).

Type species.—*Pseudothelphusa ecuadorensis* Rathbun, 1897.

Distribution.—Southern Colombia, Ecuador and northern Peru.

Remarks.—*Pseudothelphusa ecuadorensis* Rathbun, 1897, *P. henrici* Nobili, 1897, and *Moritschus narinnesis* Campos & Rodríguez, 1988 (from southern Colombia) display the same lateral elongation of the gonopods that results in the distal migration of the lateral lobe and the consequent narrowing and elongation of the apex. These characters show that the three species are closely related, although their sizes are extremely different.

Key to Species of *Moritschus*

1. Lateral margin of first gonopod's apex without spinules; caudal end produced in short beak; elongate process over field of spines with 2 rudimentary papillae directed laterally, placed near opening of spermatic channel or displaced towards lateral expansion, its distal margin entire 2
–. Lateral margin of apex covered with small closely set spinules; caudal end produced in strong finger-like process directed proximally; elongate process over field of spines formed by one papilla, displaced towards lateral expansion, its distal margin bordered by minute spinules ..... *M. narinnensis* (Colombia)
2. Elongated process over field of spines placed near opening of spermatic channel. Adult specimens very large (more than 6 cm cb.) ..... *M. henrici*
–. Elongated process over field of spines displaced towards lateral expansion. Adult specimens very small (cb less than 3 cm) ..... *M. ecuadorensis*

Moritschus ecuadorensis (Rathbun 1897) Fig. 1G, H

Pseudothelphusa ecuadorensis Rathbun, 1897:59; 1898:534, 537; 1905:279, fig. 7, pl. 13, fig. 8.—Young, 1900:210—Nobili, 1901:38.—Colosi, 1920:17.—Coifmann, 1939:107.

Guinotia (*Moritschus*) *ecuadorensis.*—Pretzmann, 1965:3.

Potamocarcinus (*Hypolobocera*) *ecuadorensis.*—Bott, 1967:370, fig. 5a–c.

Hypolobocera (*Moritschus*) *ecuadorensis.*—Pretzmann, 1971:18; 1983b:348, 363

Hypolobocera (*Moritschus*) *ecuadoriensis* (sic).—Pretzmann, 1972:52, figs. 249, 250, 316–318.

Moritschus ecuadorensis.—Rodríguez, 1982:68, fig. 37a–d.

Material.—Ecuador: Alluriquin, affluent of Río Toachi, SE of Santo Domingo de los Colorados, Pichincha Province, 31 Nov 1980, leg. H. Díaz, 12 males, the largest cl. 13.9 mm, cb. 22.0 mm (IVIC 651).—West of Gualea, 880 m alt., leg. O. Thomas, 1 male cl. 13.2 mm, cb. 25.5 mm (BM 1918.1.331.11).

Additional illustrations.—Rodríguez (1982, fig. 37a–d).

Diagnosis.—Carapace with upper frontal margin absent. First male gonopods long and slender, with lateral margin widening progressively towards apex, this extending

considerably laterally and produced in short beak; elongate process over field of spines displaced towards lateral expansion.

Moritschus henrici (Nobili 1897)
Fig. 1I, J

Pseudothelphusa henrici Nobili, 1897:1; 1901:40.—Rathbun, 1898:534, 537; 1905:302.—Young, 1900:219.—Colosi, 1920:40.—Coifmann, 1939:108.

Strengeria (*Strengeria*) *henrici*.—Pretzmann, 1965:7.

Hypolobocera (*Hypolobocera*) *henrici henrici*.—Pretzmann, 1971:17; 1972:39, figs. 260, 261, 294, 296.

Hypolobocera henrici.—Pretzmann & Mayta, 1980:139, figs. 5, 6.—Rodríguez, 1982:66, figs. 19o; 22a, f; 23d; 36a, d.

Hypolobocera (*Hypolobocera*) [*peruviana*] *henrici henrici*.—Pretzmann, 1983b:355, figs. 7, 19, 34, 42, 50, 62, 66, 75.

Hypolobocera (*Hypolobocera*) [*henrici*] *henrici nora* Pretzmann, 1977b:436 (nomen nudum); 1978:164, fig. 3.

Hypolobocera (*Hypolobocera*) [*peruviana*] *henrici nora*.—Pretzmann, 1983b:356, figs. 6, 20, 32, 43, 47, 61, 67, 84–88.

Material.—Ecuador: Leg. M. Olalla, 38 males, the largest cl. 54.8, cb. 91.1 mm, 59 females, the largest cl. 35.4 mm, cb. 56.7 mm (IVIC 615).—Monte Sumaco, Loreto, Napo Province, 450 m, Jun 1968, leg. M. Olalla, 1 male, 1 immature female (TU 94 100-7).—Río Latas, affluent of Río Napo, between Tena and Puerto Misuahalli, Napo Province, 3 Nov 1980, leg. H. Díaz, 3 males cl. 24.5, 16.2 and 8.3 mm, cb. 38.6, 24.8 and 12.9 mm (IVIC 616).—Cuevas de Jumundí, 5 km N of Archidona, near Tena, in affluent of Río Napo, Napo Province, 3 Nov 1980, 1 immature male (IVIC 968).—Río Rebadeneira, affluent of Río Arajuno, Río Napo basin, Teniente Ortíz, 18 km N of Puyo, Pastaza Province, 980 m alt., 5 Nov 1980, leg. H. Díaz, 1 male cl. 21.3 mm, cb. 35.5 mm (IVIC 619).—Puyo, Pastaza Province, 820 m alt., 10 Jan 1986, leg. Lilian Real, 1 male (IVIC 939).—Río Pladia, affluent of Río Ansú, Río Napo basin, Santa Clara, Pastaza Province, 550 m alt., 4 Nov 1980, leg. H. Díaz, 3 males cl. 18.5, 12.5 and 9.9 mm, cb. 28.7, 19.5 and 13.4 mm, 1 immature female cl. 10.2 mm, cb. 15.3 mm (IVIC 618).—Road Mera-Baños, 4 km from Mera, Río Pastaza basin, Pastaza Province, 1100 m alt., 6 Nov 1980, leg. H. Díaz, 1 mature female cl. 48.4 mm, cb. 76.5 mm (IVIC 617).

Additional illustrations.—Rodríguez (1982:66, figs. 19o; 22a, f; 23d; 36a, d).

Diagnosis.—Carapace with upper frontal margin angled, advanced, with ill-defined papillae and deep notch at middle. Third abdominal tergites with unusually deep cavities to receive apex of first gonopods, already present in juveniles. Propodous of fifth pereiopods wide, with row of plumose setae on infero-posterior margin. First male gonopods extraordinarily large, lateral margin widening progressively towards apex which extends considerably laterally, giving apex in caudal view triangular-elongated appearance; elongate process over field of spines with 2 rudimentary papillae directed laterally, placed near opening of spermatic channel.

Remarks.—The material of *Hypolobocera* (*Hypolobocera*) [*henrici*] *henrici nora* Pretzmann, 1978, consist of two male specimens, collected by Pretzmann at two localities, Mendez and Río Arajuno respectively, widely separated from each other, in the basins of Río Napo and Río Santiago. Pretzmann also collected specimens of the typical form of *H. henrici* from the same localities (Pretzmann 1978). The wide distribution of both subspecies, and their overlap at two localities, suggest that they cannot be separated as distinct subspecies. On the other hand it is not possible to give specific rank to *Hypolobocera* (*Hypolobocera*) *henrici* [*henrici*] *nora*, since the characters are part of the variability of *H. henrici*. The round distal margin of the apex in the first gonopods, mentioned by Pretzmann (1978) for *H. nora* ("Oberrand der Krönchens, in seitlicher Ansicht, stärker geknickt"), is ob-

served in all our immature specimens. The lateral lobe of first gonopods ("Außenrand der Laterallobe lateral stark ausgebaucht") displays a similar variation in our series.

Another character mentioned by Pretzmann (1978) is the relative wideness of carapace in both subspecies. The relationship cb/cl in *H. henrici* is stated to be more than 1.64 ("Cpx. breit, Index über 1.64," Pretzmann 1977b), whereas in the subspecies *nora* it is described as wider, with the radius of curvature of lateral borders larger ("VSR-Krümmungradius groß . . . Cpx breiter," Pretzmann 1978). The length of the radius mentioned is of course a function of the carapace width. In a series of 26 specimens from one locality we examined, the relationship cb/cl varies between 1.51 and 1.66 according to the size of the specimens.

Biogeography

The section of the Andes comprised within the territory of Ecuador (Fig. 13) is divided into five major basins draining to the Pacific, and three basins to the Amazon. From North to South the Pacific basins begins with the valleys of the rivers Mira and Esmeraldas, followed by several littoral valleys isolated from the Daule basin by the low mountains of the Manabí Province; after the estuary of Guayas lies the basin of the Rio Jubones and a few minor littoral streams. The basin of the Daule–Vinces rivers, enclosed between the Andes and the Manabí mountains, is the most extensive valley on the Pacific drainage. The Amazonian drainage comprises to the North, the basin of the Napo River, and to the South the basins of the Pastaza and Santiago rivers. These last two drain the internal valleys of the Oriental and Central Cordilleras, and discharge into the Marañon River.

The distribution of species among these eight basins is unequal. The largest numbers occur in the Esmeraldas and Napo basins, with ten and seven species respectively. This abundance is related mainly to the extension and topographic complexity of these basins, but possibly also to a more intensive collecting effort due to the vicinity of large cities. Several species are known from single localities, underlining our imperfect knowledge of the fauna; these are: *Hypolobocera orcesi*, *H. muisnensis*, *H. mindonensis*, *Lindacatalina hauserae*, *L. sumacensis*. The most interesting cases are those of trans-basin distribution. Two extreme examples are *Hypolobocera aequatorialis* and *Lindacatalina. orientalis*, which involve distribution across the main Andean water divide. *H. esmeraldensis*, *H. guayaquilensis*, *H. rathbuni*, *H. exuca*, and *Moritschus henrici*, exhibit similar trans-basin distributions. According to the present records and others available in the literature, the area of distribution of *H. henrici* covers the basins of four of the largest effluents of the Amazon: Río Napo (Pretzmann 1978), Río Pastaza (Pretzmann 1972), Río Santiago (Nobili 1897, holotype; Pretzmann 1972, 1978) in Ecuador, and Río Ucayali in Perú (Pretzmann & Mayta 1980, Rodríguez 1982). This is one of the largest ranges for a species of Pseudothelphusidae.

The vertical distribution of the species (Table 2) on the Pacific side ranges from 50 m to 2000 m. *Hypolobocera delsolari* extends from 50 to 1 500 m along the Río Jubones; *H. esmeraldensis*, *H. guayaquilensis*, *H. konstanzae* and *H. muisnensis*, have been found along the coastal plain of the Esmeraldas and Manabi provinces, between 150 and 200 m, but *H. guayaquilensis* has been also recorded inland in the Daule valley (Fig. 13). The other species on the Pacific side are inland dwellers: *H. caputii* and *H. rathbuni*, found at 200 m and between 200 and 450 m, respectively; *H. mindonensis*, *H. orcesi*, and *Moritschus ecuadorensis* between 950 and 1200 m; and *H. exuca* at 100 and 2000 m. On the Amazonian side the species range from 400 to 1500 m: *H. conradi* between 900 and 1500 m; *Lindacatalina orientalis* and *L. puyensis* between 1000 and 1200 m; and *L. hauserae*, *L. latipenis* and *L. sumacensis*, between 400 and

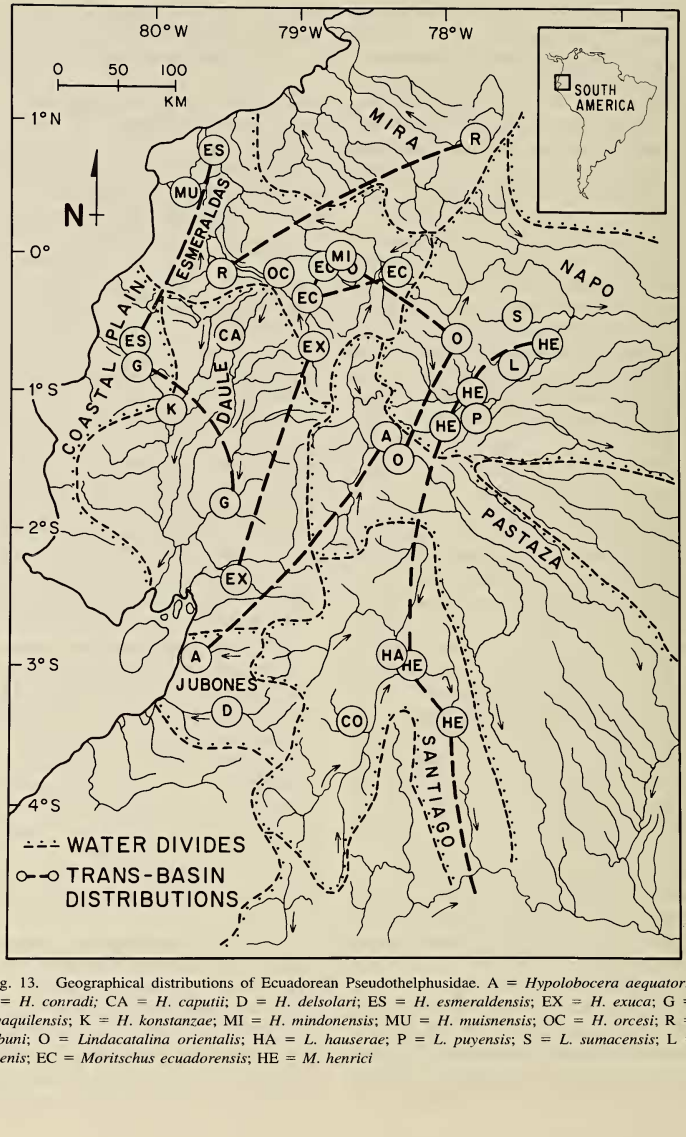

Fig. 13. Geographical distributions of Ecuadorean Pseudothelphusidae. A = *Hypolobocera aequatorialis*; CO = *H. conradi;* CA = *H. caputii*; D = *H. delsolari*; ES = *H. esmeraldensis*; EX = *H. exuca*; G = *H. guayaquilensis*; K = *H. konstanzae*; MI = *H. mindonensis*; MU = *H. muisnensis*; OC = *H. orcesi*; R = *H. rathbuni*; O = *Lindacatalina orientalis*; HA = *L. hauserae*; P = *L. puyensis*; S = *L. sumacensis*; L = *L. latipenis*; EC = *Moritschus ecuadorensis*; HE = *M. henrici*

Table 2.—Altitudes reported for Ecuadorian Pseudothelphusids (m above sea level).

Hypolobocera aequatorialis	50–1750
H. caputii	200
H. conradi	900–1500
H. delsolari	50–1500
H. esmeraldensis	150
H. exuca	100–2000
H. guayaquilensis	200
H. konstanzae	200
H. mindonensis	1000–1200
H. muisnensis	200
H. orcesi	1200
H. rathbuni	200–450
Lindacatalina hauserae	500
L. latipenis	400
L. orientalis	1200
L. puyensis	1000
L. sumacensis	450
Moritschus ecuadorensis	950–1200
M. henrici	450–1100

500 m; *Moritschus henrici* between 450 and 1100 m.

Hypolobocera aequatorialis has been collected at 50 m on the Pacific side, and from 700 to 1750 m on the Amazonian side. This vertical distribution, together with the trans-basin distribution mentioned above, is rather peculiar for a species of Pseudothelphusidae. However, we were unable to find differences among the specimens from the area of the Jubones River and those from the vicinity of Baños, recorded under our materials of this species.

Moritschus henrici and the species of *Lindacatalina* reach the lowest altitudes recorded for the Andean species on the Amazonian side. Further on the lower course of the Amazonian tributaries, in Colombia and Brazil, the Andean Hypolobocerini are replaced by other species taxonomically very distant, belonging to the tribe Kingsleyini, mainly species of the genus *Fredius* (Magalhaes 1986; Rodríguez & Pereira 1992; Rodríguez & Campos, 1998).

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Literature Cited

Bott, R. 1967. Flußkrabben aus dem westlichen Südamerika (Crust., Decapod.).—Senckenbergiana Biologica 48(5/6):365–372.

———. 1970. Betrachtungen über die Entwicklungsgeschichte und Verbreitung der Süßsswasser-Krabben nach der Sammlung des Naturhistorischen Museums in Genf/Schweiz.—Revue Suisse de Zoologie 77, fascicule 2(24):327–244.

Campos, M., & G. Rodríguez. 1988. Notes on the freshwater crabs of the genus *Moritschus* Pretzmann, 1965 (Crustacea:Decapoda:Pseudothelphusidae) with description of *M. narinnesis* from Southern Colombia.—Proceedings of the Biological Society of Washington 101:640–643.

Coifmann, I. 1939. Potamonidi della Guiana Inglese raccolti dal Prof. Nello Beccari.—Archivio Zoologico Italiano 27:93–116.

Colosi, G. 1920. I Potamonidi dell R. Museo Zoologico di Torino.—Bolletino dei Musei di Zoologia ed Anatomia Comparata della R. Universita di Torino 35(734):1–39.

Conde, J. E., H. Díaz, & G. Rodríguez. 1989. Crecimiento reducido del cangrejo de mangle *Aratus pisonii* (H. Milne Edwards) (Brachyura:Grapsidae).—Acta Científica Venezolana 40:159–160.

Magalhães, C. 1986. Revisão taxonômica dos caranguejos de água doce brasileiros da família Pseudothelphusidae (Crustacea, Decapoda).—Amazoniana 9:609–636.

Mayr, E. 1964. Systematic and the origin of species. Dover Publications, Inc., New York, 334 pp.

———, E. G. Gordon, & R. L. Usinger. 1953. Methods and principles of systematic zoology.

McGraw-Hill Book Company, Inc. New York, 328 pp.

Milne Edwards, H. & H. Lucas. 1842–1844. Crustacés. In: A. d'Orbigny, Voyage dans l'Amérique méridionale dans le cours des annés 1826–1833 6(1):1–39, Atlas 9:pl. 1–17.

Nobili, G. 1897. Viaggio del Dr. Enrico Festa nella Republica dell'Ecuador e regioni vicine. I Decapodi terrestri e d'acqua dolce.—Bollettino dei Musei di Zoologia ed Anatomia Comparata della R. Università di Torino 12(275):1–6.

———. 1901. Decapodi raccolti dal Dr. Filipo Silvestri nell' America meridionale.—Bollettino dei Musei di Zoologia ed Anatomia Comparata della R. Università di Torino 16(402):1–16.

Ortmann, A. 1893. Die Dekapoden-Krebse des Strassburger Museums, mit besonderer Berücksichtigung der von Herrn Dr. Döderlein bei Japan und bei den Liu-Kiu-Inseln gesammelten und zur Zeit in Strassburger Museum aufbewahrten Formen. VII. Theil. Abtheilung: Brachyura (Brachyura genuina Boas) II. Unterabtheilung: Cancroidea, 2 Section: Cancrinea, 1. Gruppe: Cyclometopa.—Zoologische Jahrbücher, Abtheilung für Systematik, Geographie und Biologie der Thiere 7:411–495.

———. 1897. Carcinologische Studien.—Zoologische Jahrbücher, Abtheilung für Systematik, Geographie und Biologie der Thiere 10:258–372.

Pocock, R. I. 1889. Contributions to our knowledge of the Crustacea of Dominica.—Annals and Magazine of Natural History (6)3:6–22.

Pretzmann, G. 1965. Vorläufiger Bericht über die Familie Pseudothelphusidae.—'Anzeiger der Mathematisch Naturwissenschaftliche Klasse der Österreichischen Akademie der Wissenschaften (1)1:1–10.

———. 1968. Neue Südamerikanische Süßwasserkrabben.—Entomologisches Nachrichtenblatt (Wien) 15(1):1–15.

———. 1971. Fortschritte in der Klassifizierung der Pseudothelphusidae.—Sitzungsberichten der Österreichischen Akademie der Wissenschaften, Mathematisch Naturwissenschaftliche Klasse (1) 179(1–4):15–24.

———. 1972. Die Pseudothelphusidae (Crustacea Brachyura).—Zoologica 42(120) pt. 1:1–182.

———. 1977a. Notizen zur Biologie der Süßwasserkrabben.—Anzeiger der Mathematisch Naturwissenschaftliche Klasse der Österreichischen Akademie der Wissenschaften 7:87–89.

———. 1977b. Zur Taxonomie, Chorologie und Systematik der mittelandischen Hypolobocerini.—Sitzungsberichten der Österreichischen Akademie der Wissenschaften, Mathematisch Naturwissenschaftliche Klasse (1) 186:429–439.

———. 1978. Neue Süßwasserkraben aus den Anden.—Sitzungsberichten der Österreichischen Akademie der Wissenschaften, Mathematisch Naturwissenschaftliche Klasse (1) 187:163–170.

———. 1983a. Ergebnisse einiger Sammelreisen in Südamerika 1. Teil: Neue Pseudothelphusidae.—Annalen der Naturhistorisches Museum (Wien) 84/B:301–305.

———. 1983b. Die Pseudothelphusidae von Ecuador.—Annalen der Naturhistorisches Museum (Wien) 84/B:347–368.

———, & R. Mayta. 1980. Über einige Süßwasserkrabben aus Perú.—Anzeiger der Mathematisch Naturwissenschaftliche Klasse der Österreichischen Akademie der Wissenschaften 9:137–144.

———, & A. Radda. 1978. Berich über zoologische Studien- und Sammelreisen in Peru and Ecuador 1976/77.—Annalen der Naturhistorisches Museum (Wien) 81:589–595.

Rathbun, M. J. 1893. Descriptions of new species of American freshwater crabs.—Proceedings of the United States National Museum 16(959): 649–661.

———. 1897. Descriptions de nouvelles espèces de Crabes d'eau douce appartenant aux collections du Muséum d'Histoire naturelle de Paris.—Bulletin du Muséum nationale d'Histoire naturelle (Paris) 3(2):58–61.

———. 1897. Descriptions de nouvelles espèces de Crabes d'eau douce appartenant aux collections du Muséum d'Histoire naturelle de Paris.—Bulletin du Muséum nationale d'Histoire naturelle (Paris) 3(2):58–61.

———. 1898. A contribution to a knowledge of the freshwater crabs of America. The Pseudothelphusinae.—Proceedings of the United States National Museum 21(1158):507–537.

———. 1905. Les crabes d'eau douce (Potamonidae).—Nouvelles Archives du Muséum d'Histoire Naturelle, Paris 7:159–321.

Rodríguez, G. 1980. Description préliminaire de quelques espèces et genres nouveaux de Crabes d'eau douce de l'Amérique tropicale (Crustacea, Decapoda, Pseudothelphusidae).—Bulletin du Muséum nationale d'Histoire naturelle (Paris) (4) 2, Section A (3):889–894.

———. 1982. Les Crabes d'eau douce d'Amerique. Famille des Pseudothelphusidae.—Faune Tropicale 22:1–223.

———, & H. Díaz. 1981. New Species of Freshwater Crabs from the Andes (Crustacea, Decapoda, Pseudothelphusidae).—Senckenbergiana Biologica 61:305–312.

———, & M. Campos, 1998. A cladistic revision of the genus *Fredius* (Crustacea: Decapoda: Pseudothelphusidae) and its significance to the biogeography of the Guianan lowlands of South

America.—Journal of Natural History (In press).

———, & G. Pereira, 1992. New species, cladistic relationships and biogeography of the genus *Fredius* (Crustacea: Decapoda: Pseudothelphusidae) from South America.—Journal of Crustacean Biology 12:298–311.

Smalley, A. E. 1964. A terminology for the gonopods of the American river crabs.—Systematic Zoology 13:28–31.

Smith, S. I. 1870. Notes on American Crustacea. I. Ocypodoidea.—Transactions of the Connecticut Academy of Arts and Sciences 2:113–176.

Young, C. G. 1900. The stalk-eyed Crustacea of the British Guiana, West Indies and Bermuda. London, 514 pp.